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Compliments of the Author.

Electricity in Carcinoma.

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BY

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NEW YORK.

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ELECTRICITY IN CARCINOMA¹

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IT is a very ungrateful task to write a paper on the treatment of cancer, while pessimists insist that cancer is incurable and the profession look with suspicion on any report of a successful case, and still more hazardous to say that electricity has cured; nevertheless, it *has*.

The object of this paper, is to give the different ways in which electricity has been used in the treatment of cancer—to report some cases, and to give the author's experience, with the hope of drawing the attention of electrical experts to this subject, so that some method of treatment may be systematized and adopted, which may lead to progress and greater success with this valuable agent.

While there are on record some cases of unquestionable cure of cancer by electricity, it cannot be denied that many failures have resulted. Cancer patients are fickle and very difficult to manage, and usually come for treatment too late; hence, as a rule, cures are rare by every method.

In electricity no scientific plan has been adopted; unsuitable cases are taken by unqualified practitioners. Sufficient care and patience are not exercised. So much the more reason then for persistent study to find a remedy.

¹Read before the American Electro-Therapeutic Association at the first annual meeting, held at Philadelphia, September, 1891.

DIFFERENT METHODS OF ELECTRIC APPLICATION IN CANCER.

In the treatment of cancer electricity has been used in various forms, but electrolysis has been most prevalent, and this has been applied in different ways. In considering these different methods, four distinct divisions must be made, viz. :

1. Galvanism.
2. Electrolysis.
3. Galvano-cautery.
4. A combination method of two of the former.

As it is impossible in this paper to go over the whole literature on the subject and to discuss all the theories and cases, a select bibliography is attached, to which the student is referred.

This arranged under different heads is as follows :

A. General remarks, theories, observations, etiology, pathology, and the question, Is a cancer a constitutional or a local disease?

B. On inoculation of cancer and grafting.

C. Treatment of cancer.

C 1. By galvanism.

C 2. By electrolysis.

C 3. By galvano-cautery.

C 4. By a combination of methods.

In considering the four principal applications of electricity in the treatment of cancer, first in order comes—

1. Galvanism.

This has been applied externally with pads or sponge electrodes, and (the interrupted current) with needles.

The external application by the galvanic (constant) current with two sponge electrodes to the skin, on or near the tumor, has not met with success, and

it seems has only stimulated the cancer cells to greater proliferation, and has thereby hastened the end. The author is not acquainted with a successful case, by external application of galvanism.

The second method, by the interrupted galvanic current with needles, deserves more earnest consideration. It was inaugurated recently by Dr. I. Inglis Parsons, of London, who calls it "The Arrest of Growth in Cancer, by the Interrupted Voltaic Current."

In the annexed bibliography under C 1, much reference is made to the literature of this method. Author had the pleasure of seeing Dr. Parsons at his office last year, during a trip to London, and was kindly shown the instruments and their uses. A galvanic battery with strong currents from 100 to even 600 milliamperes is used. Two needles are inserted, one into the tumor, the other outside of the tumor. Each needle is connected with one pole of the battery. Then a strong interrupted or alternating current is used by causing shocks, and the current is reversed twenty to thirty times in rapid succession. A second or third series of twenty to thirty reversals may follow; the electricity is not allowed to flow in one direction, as the direction of the current is constantly changed. It is immaterial to which pole of the battery the needles are attached. He gives strong currents in some locations of the body; a strength of even 400 to 600 milliamperes is frequently used.

The battery used must have a high electro motive force, capable of sending 500 milliamperes through a resistance of 800 ohms. Dr. Parsons says that his method of treatment is based on the hypothesis "Cancer consists of new cells which have been formed during the process of repair or inflammation, and in an active state of proliferation have escaped from the control of the nervous system." The deduction to be drawn from this hypothesis is "That, although

the cells of cancer multiply more rapidly than those of healthy tissue, the absence of a nerve supply places their vitality, and more especially their recuperative power, on a lower plane than the latter." It will be seen that in this method, by the sudden reversals of the current, an electrolytic action is impossible, and no chemical decomposition can take place at either pole. For this reason author has classified the Parsons method as *galvanic* in contradistinction to *electrolytic*. By flashing the strong current forward and backward, the intention is to produce a mechanical injury and obliterate the cancer cells without destroying the healthy tissue.

Dr. Parsons is a young and intelligent physician, who, in London Medical Societies, did not pretend to *cure* cancer, and modestly calls his method "The Arrest of Growth in Cancer." In the meeting of April 11, 1890, he stated that in his first case thus treated, the cancer had not reappeared for one year and eight months. At the same meeting the usual opposition was made by some surgeons (par excellence), who said they preferred a sweeping operation with the knife, and if the tumor reappears, no matter, they cut again. Now the question arises, What will be left of the patient if they keep on cutting, and then have they cured the disease or the patient? Author has been conversant with a case which had been treated temporarily by Dr. Parsons, and thinks it of sufficient interest to briefly relate:

Case: Scirrhus.—Nine operations with the knife; relapse; a hopeless case; much benefited by Parsons' method, and further, also, by electrolysis.

Miss C. N. B., aged thirty-six years, single, had scirrhus of the breast six years ago. Since July, 1886, has been operated on nine times with the knife, by celebrated surgeons in London, Rome and Berne. The disease always returned, and nodules of scirrhus

appeared also in other parts of the body, as the other breast, in axilla, neck, etc. The last operation was in October, 1889, when one nodule could not be removed with the knife, because the tumor was imbedded in the jugular vein. Patient went to Dr. Parsons, who applied his own method four times in 1889 and beginning of 1890. April 4, 1890, patient came under my professional care. She had seen some surgeons in New York, who all declared her case hopeless. One surgeon told me that the patient could not live longer than six months, that some bones were carcinomatous and further use of the knife was inadmissible. Nodules were found on the right side in axilla, neck, breast and side below, and connected with the pectoralis. The nodule over clavicle, mentioned above, was imbedded in the jugular and the pulsation of the carotid could be seen and felt.

The galvanic applications by Dr. Parsons were made each time with two needles. From examinations and the statements of the patient herself, there is no doubt that Dr. Parsons' treatment benefited her.

From April 19 until June 25 patient was treated at six different times with strong currents of electrolysis; each time being under chloroform; at each séance two of the following gentlemen were present and assisted: Drs. G. C. H. Meier, S. De Wolf Waite and A. Doty. The *modus operandi* was as follows: The positive pole was a wire frame covered with absorbent cotton, dipped in hot water, and placed at the back of the patient on the right side below the scapula. The negative pole consisted of one or two platinum needles, which were plunged into the tumor or a nodule. The strength of the current used varied from 100 to 200 milliamperes, which is much stronger than I generally use. Each séance lasted about fifteen minutes, during which time the needles were used successively in different

places; sometimes two needles were used simultaneously in the same or in two different localities. At the first séance one needle was kept five minutes in the nodule above the clavicle, and the next four minutes in a nodule in the axilla. The nodules almost disappeared under the action of the current; the particular nodule near the jugular became hard, and in due time disappeared entirely. The two localities just mentioned were surgically dangerous, and on account of the proximity of the important vessels the knife could not have been used. Patient was much improved in body and mind; the tumors had nearly disappeared. When she first came for treatment her right arm was in a sling, being very painful and useless. Now the pain has disappeared entirely, and she uses that arm just the same as the other healthy member. She enjoyed the summer in Saratoga.

In October two more applications of electrolysis were given, and patient went to the West Indies. In Jamaica, was very sick with dysentery, lost flesh and ran down generally.

March, 1891, returned from Jamaica, a generous diet improved the general health. No return of any visible cancer nodules. Patient was anxious to have more electrolytic treatment, but as there was no particular indication, only one séance was given, and she left for Italy.

Remarks.—This case is interesting in many ways. It was a hopeless case which even the surgeons refused to cut; authorities thought she could live not longer than six months. Nine cutting operations had been performed, and the microscope had settled beyond any doubt that the disease was malignant. The fact is incontrovertible, that the patient left in good spirits and better health one year after she had first applied for treatment. From the beginning of this treatment a cure was not expected or claimed, but the

electric treatment certainly did result in much good. Dr. Parsons, in London, was not given time to do much for the patient, but there is no doubt that she was much benefited by his treatment.

2. Treatment by Electrolysis.

In the treatment of cancer by electricity, electrolysis has been mostly used, and is best known. It differs widely from the former method of galvanism, which by a strong mechanical action is expected to destroy the cancer, just as the alternating strong current kills in electrocution. Electrolysis on the other hand either destroys, causing decomposition by its chemical action, or causes absorption according to the strength of the current employed. The art of applying electrolysis successfully consists in using the correct strength of electric current, applying the respective poles in the right place, selecting the size, shape and material of the electrode, and regulating the duration and intervals of séances.

There are two methods in vogue, one causing destruction the other absorption. A mild current can affect absorption only, a strength from 5 to 30 milliamperes may be used and even more, according to work done. A strong current from 25 and upward to even 200 milliamperes (and some operators have used even more), will destroy tissues to such a degree that the tumor may slough off as a dead mass. A good rule is to apply the current not stronger than necessary to accomplish the object. There is no use in applying 100 milliamperes when 30 will do, and there is danger that a too strong current will even defeat the purpose for which it is given. For electrolysis a galvanic battery must be used. There are two ways of operation: in one, needles are used at both poles; in the other, needles are used at the negative pole only, while a pad moistened with hot water,

as the positive pole, is placed on some indifferent part or near the tumor. When needles are used at either pole one or more needles may be inserted at the same time. The best needles for electrolysis are made of platinum, which is the only metal that will not decompose at the positive pole.¹ However, some operators use needles of other metals, as gold, zinc, steel, etc., for which they probably have some reason. The needles ought to be plunged deep into the tissue to avoid the burning or destruction of the cuticle, as well as a running sore at the point of entrance. If the tumor is near the cuticle the current must be regulated so that it will not destroy the integument. No one rule can be laid down for the management of all cases, as varying circumstances will call for a different use of the poles etc., and a good result depends entirely on the intelligent management of each individual case.

Interpolar Action.—It is still undecided whether there is an interpolar electrolysis. Parsons says there is none, while others try to prove the opposite. It is certain that the decomposition by electrolysis is most at and around the termini of the poles, while the molecules flow *between* the poles. If there is an interpolar electrolysis, which is doubtful, it necessarily must be in a lesser degree than at the poles themselves. The knowledge of such facts is very important for the successful treatment of cancer by electricity.

To obtain more knowledge about the electrolytic action, author made some experiments in 1874, which may be summarized as follows:

Experiments I.—Specimen from carcinomatous tumors after their removal by the knife, were subjected to electrolysis. Needles were inserted into the tumor

¹Newman: Platinum Needles for Electrolysis, *Journal American Medical Association*, 1891, August 8.

at a distance of one and one-eighth or one and one-quarter inches from each other, and a current of 36 cells of a galvanic battery was used. After ten minutes the hard cancerous mass was softer; bubbles of hydrogen were seen one to one and one-half inches distant from the negative pole, the greatest change took place at the negative pole. Afterwards the microscope found no cancer cell, only fibrine; while the original tumor was pronounced scirrhus by the committee of the New York Pathological Society.

Several other experiments gave the same results, which were, however, verified later by the experiments with specimens from the living body.

Experiments II, January, 1891.—Specimens from the breast of a lady were found scirrhus by microscopical examinations. The tumor on the living patient then was treated by electrolysis, but could not be absorbed. Then the tumor was removed, and in this specimen no cancer cells found. The microscopical examinations were all made by experts, and I have here some slides, which may be examined.

The conclusions are, that electrolysis can destroy cancer cells, and that electrolysis causes specific decomposition at the pole and within a radius of one and one-half inches. Therefore, if needles are inserted in a tumor at a distance of two and one-half inches, it may be expected that the electrolysis acts in such a manner that no interstices are left between the needles, which will retain the life of cancer cells. According to such conclusions, I have operated principally by two methods. If an absorption by electrolysis was intended, the whole tumor was electrolyzed in sections with needles connected with the negative pole, one, two or more needles in the tumor at a time, while the positive pole was applied as a large pad outside, on the cuticle or near the tumor.

The second method is by having needles from both poles, the positive pole (a single needle) in the center of the tumor; the negative needle or needles at the circumference or even outside, but near the margin of the tumor, in the manner and at the distance mentioned before. This was applied for the destruction of the diseased mass, to be sloughed off. In the first method by absorption, weak currents were used and no anæsthetic, as no pain was caused.

Other operators have their own methods, which, however, do not differ from the principle and theories here mentioned. From all of which good results and cures have been reported.

Dr. Neftel, who is a pioneer in this electrolytic work, has reported many cures. He believes that electrolysis, besides its local effects, produces also a remote constitutional change; as soon as the protoplasm has by the electrolytic process lost its specific qualities, the cancer is prevented from reproducing itself, and gradually disappears through the process of absorption.

Beard and Rockwell report six cases in "Clinical Researches in Electro-Surgery;" some of which were cured. These are:

1. Epithelioma of lower lip; recovery.
2. Large epithelioma of upper lip; satisfactory healing.
3. Scirrhus of the left breast; complete and instant relief from pain, etc.
4. Scirrhus of the right breast; relieved, but electrolysis with a strong current does not appreciably effect the growth.
5. Scirrhus of the breast; great relief of pain. Death from exhaustion.
6. Epithelial cancer of rectum, etc.; relieved.

Beard once inaugurated his method, which he called working up the case by electrolysis, which consisted

in passing two needles from both poles deep in the tissues beneath the tumor. I vide Bibliography C 2.

W. H. Mussey reported, in 1872,¹ a cure by electrolysis, after repeated energetic applications in short intervals.

Dr. Gunning's successful case of cancer of cervix uteri is reported in Grandius' "Practical Treatise on Electricity." He uses one or more needles in the growth as positive pole, and several needles as the negative pole under the growth, with a galvanic current of 150 milliamperes. The aim of his method is to cut off the blood supply from the diseased surface as to cause it to slough. One year after the operation no return of the disease had taken place.

Dr. Ernest Wende reports cases in the "*Buffalo Medical and Surgical Journal*, December, 1890." His case: III. *Epithelioma of face*, cured by electrolysis, is very interesting, and given here as reported.

W. H. S., a well-known gentleman of this city, for many years court stenographer, and at one time a medical student, first consulted me for malignant disease May 25, 1889. The affection in question was an epithelioma, situated on the side of the nose, in close proximity to the eye, in fact, involving the neighboring parts of both the upper and lower lids. The following is the history and the treatment as addressed to that terrible disease from the time of its first occurrence to the present date, written by the patient himself. I will give verbatim, as there is but little for me to add:

About twenty years ago there first appeared a small growth, in appearance similar to a wart, upon the left side of the nose, at a point about equidistant from the corner of the eye and the ridge of the nose. In the course of a year or so it would occasionally de-

¹ Trans. Americ. Medical Assoc., 1872, Phila., xxiii., p. 523.

velop a small scab, and upon its being removed, either purposely or accidentally, there would exude a small quantity of serum. It would then heal up and be scarcely visible for some weeks, and even months. The formation of the scab became more frequent, and the size of the growth gradually became larger. About thirteen years ago I consulted the late Dr. Miner of this city, who advised its removal by the knife. He removed it in that manner. It was done at a time when he was in feeble health, and without an assistant. It bled very profusely, and from subsequent results I am satisfied there was not enough of the tissue removed. However, it healed up, and gave me no more trouble for a year or so, when it began to develop again, and more rapidly than before. I then consulted Dr. Cronyn, who was my family physician, and he advised its removal by erosion, with a sharp spoon. The effect of that treatment was about the same as that given by Dr. Miner. After continuing this treatment for a couple of years, at intervals of from three to six months, he applied a mercurial plaster, but after a few months it returned as before. He advised me to go to the late Dr. Davidson, who was making skin diseases a specialty. He treated it with mild caustics, healing it with a salicylic acid ointment. He continued this treatment for two years and a half, when he informed me that he could do nothing further for it. It had at that time spread, covering a place about five-eighths of an inch across. I then went to a cancer doctor; gave him a history of the case. He predicted that he could cure it in ten weeks, completely. He agreed to charge me nothing unless he effected a complete cure. He applied his cancer plaster on about thirty different occasions, each treatment covering a period of three or four days, and of the most hellish torture possible to imagine. At the end of two years

and a half, when the disease had spread until it covered about four times the surface that it did when he began, and extending into the canthus, I bolted. During the last year of his treatment I had been unable to use my eye for any business purpose whatever. I decided it was better to die a natural death, if necessary, from the progress of the disease than to be tortured.

I next consulted Dr. Wende, who began his treatment one year ago last May. His first treatment by electrolysis was so successful that in less than a week the inflammation which had been present in my eye, and keeping it nearly closed during the entire time of the cancer doctor's treatment, had almost entirely disappeared. From that day until this I have been able to attend to my business and use my eye daily, and without annoyance. If I was able to endure the treatment without having cocaine injected into the tissues, causing the eye to swell, the effects of the treatment would not be noticeable to the casual observer from any swollen appearance of the eye. When Dr. Wende began his treatment there was over one square inch of surface of open sore, and as much more highly inflamed. At the present time the entire surface actually treated covers less than one eighth of an inch in diameter, and in only three different points.

W. H. S.

In treating the ulceration I first injected a 4 per cent. solution of cocaine in the surrounding and underlying induration, and then with the ordinary iridio-platinum needle destroyed the abnormal tissue with numerous negative galvano-punctures. The insertions were made in various directions, frequently one above the other, and often at right angles with each other. The current that was allowed to pass varied from 5 to 15 milliamperes. I cannot give the exact number of sittings the patient has had, approx-

imately should say about twenty, given at irregular intervals, varying in duration from fifteen to thirty minutes. The infiltration grew gradually less after each treatment. Although not cured, the agonizing pain ceased, and the incessant nervous agitation and distress suspended. However, should I not succeed in entirely removing this dire infection, even in this most promising case, it may be truly said that electrolysis has done more to alleviate the suffering, and more toward affording a most likely means of reaching the cause than the knife or the caustic.

Dr. E. Wende, in a letter sent me September 9, 1891, says: "The case of W. H. S., which I reported, is practically well, and has been for some time. Have sent you photograph of case showing cicatrix.

"Electrolysis is my favorite means of treating an epithelioma, be it large or small. Can produce a record, however, it may appear small, of thirteen cases cured. Have just succeeded in healing a monster, by weekly sittings, after the knife, caustic, and cancer doctors failed. Will also send you a photograph of this patient within a few days."

The photographs of both cases have been received, and are here for your inspection.

The patient represented in the last picture is now seventy-six years old.

Dr. Waite, who is expected to be present, has seen the cases of Dr. Wende, and can affirm the statements made.

Dr. Geo. H. Rohé, of Baltimore, in a private communication of September 22, 1891, writes: "I have treated a considerable number of small epithelial growths by electrolysis, and believe that I have in some cases cut short the malignant tendency in the growth. I would not like, however, to speak of this as curing carcinoma.

"I remember one case, a small pigment sarcoma, growing on the site of a mole, which was removed by electrolysis, and where no recurrence took place in situ. The patient died about a year afterward of apoplexy. Secondary infection of a neighboring gland had occurred, which seemed to be hindered in its progress by percutaneous applications of the current."

Author's Experience with Electrolysis.—Author commenced in 1874 the electrolysis treatment in cancer, and has had considerable experience with these maladies. The results varied; some were failures; some patients' lives were prolonged, and there were also cures; some patients remaining well without any sign of recurrence of the growth for many years. It would take too much time to relate these cases here in detail, only one case has been published, the specimen being presented to the New York Pathological Society, and examined by the Society's Committee on Microscopy and other experts. Here are some microscopical slides and drawings belonging to this case for the inspection of the members of our association, which has, and still can prove, that the case was carcinoma beyond any doubt.

The case mentioned under the former chapter of the Parson's method was treated by the author entirely by electrolysis, and shows what benefit was given thereby, even in an entirely hopeless case, and it is not the end, as the patient still lives.

A case of epithelioma of the face, treated by electrolysis, in which no recurrence of the disease occurred in seven years, ought to be counted as a cure. An old lady, seventy years old, came under treatment with an epithelioma above the malar bone, one inch below the eye, in October, 1878. During four days of observations the tumor grew visibly larger, so that it was evident there was no time to be lost, electrolysis was used with one needle as negative, inserted in the

tumor and a sponge electrode in the hand as positive. My assistant urged an excision, and considered the application of electrolysis useless, as only losing valuable time. The result was, that after a few séances, the tumor sloughed, and then a rapid recovery took place, so that in due time not even a scar was observable. The patient was seen once a year at least, for seven years until 1885, during which time no new growth reoccurred, and she remained in perfect health, while seventy-six years of age. She has not been seen since. Can any one object that here was not a cure. If so, how many years are wanted without a recurrence of growth, till my fastidious friends will permit it to go on record as a cure?

These cases, among others, are only mentioned in a passing review to show that positive cures can be shown by author, as well as by other operators.

In some cases the malignant tumors were removed with success, but the patients died soon after, from some intercurrent disease, which, however, were not claimed as decided successes or cures. Neither is it denied that failures have often occurred, after very careful treatment. However, the cessation of pain in every case is claimed as a brilliant result of the treatment by electrolysis.

The report of successful cases in detail is reserved for another occasion.

3. *Treatment of Cancer by Galvano-cautery.*

The principal use of this method has been made in amputation by the galvano-caustic wire ecraseur—particularly of the tongue, cervix uteri and the breast, and also by platinum burners to destroy, or even extirpate smaller growths—successes and failures are of record. Author knows a patient in good health now, 1891, whose cervix uteri was removed in this way by Dr. Noeggerath twenty years ago. Dr. W. E. Stevenson reports in the tabular statements of his work in

the St. Bartholomew Hospital, London, cases of epithelioma of vulva, carcinoma of cervix uteri, scirrhous of breast, etc. Time had not elapsed sufficient to express any opinion as to the ultimate result. Dr. J. Byrne, of Brooklyn, seems to have had the most experience with this method in treating malignant tumors of the uterus. He has an experience of twenty-five years, in which he has constructed his own batteries and improved his own method. He removes the cancerous tissue with the galvano caustic sling, and thoroughly re-cauterizes the surface and the edges of the tissues from which the cancer has been removed. Out of 367 cases thus treated, there was no return of the disease in two to eight years in 153 cases.

The 153 cases heard from and utilized in his tabular statement are divided in four classes, the disease being :

1. In portio vaginalis, 36 cases, no return of growth eight and seven-twelfth years in average.
2. In entire cervix, 35 cases, no return of growth five and a half years in average.
3. In corpus uteri, 4 cases relieved for two years.
4. In both body and uterus, 87 cases relieved for three years.

In further explanation of such cases a quotation from Dr. Byrne's letter to author is interesting, he writes as follows :

"The table representing class No. 1 in my paper needs correction to this extent : The number known to have enjoyed exemption from recurrence of disease should be 40 instead of 36, and as 3 more have since turned up, 1 after thirteen years, 1 eleven years, and 1 eight years, an average of the entire 43 cases gives eight years' exemption. This is for cases, when the disease has been supposed to be confined to the portio-vaginalis. In the case operated upon over thirteen years ago, however, there is more enlargement and indura-

tion of the submaxillary and cervical glands, which I consider cancerous, but the pelvic organs are so far intact. Such splendid results can only be obtained by strictly following my method of operating. Stewing wet and bleeding tissues by any heated metallic instrument will accomplish but little, and this is the way in which cautery operations are usually conducted. What is wanted is a *deep dry roast*." Author has not been very successful with his galvano-caustic operations in cancer, and all he can claim is to have prolonged life in some, but an immediate relief and the control of hemorrhage in all cases. Once a peculiar method was practised by the galvano cautery cutting through the superficial tissues, encircling the tumor entirely, making thereby a deep ditch, which separated the healthy tissue from the affected. The intention was to prevent the cancer cells from spreading and retaining the same inside the circle, which was then treated separately, that was a failure; the deep ditch made, was painful, by being denuded of the protecting cutaneous covering. Besides, at the time of this procedure, the disease had already infiltrated many tissues and other organs of the body outside the circle, as stomach and liver; which, however, was not known at the time. It is doubtful if it would have been a success if the cancerous cells were located only in the central tumor.

4. *Treatment by a Combination.*

This consists of an application of two of the former methods, mostly combining the application of the electrolytic and electro-caustic effects of the battery in the same case. It was recommended by H. Noeggerath, in *American Journal of Obstetrics*, N. Y., 1878, Vol. XI, page 146. Many operators have made use of this method, making their own combination. Author had a successful case of keloid in 1878. The

tumor was in the arm of a young man, which had reappeared after excision with the knife. The tumor was very hard, but softened after electrolytic action with a platinum needle inserted in tumor as the negative pole. The current was 15 to 20 milliamperes strong, and was applied for fifteen minutes, after the second séance tumor was extirpated with the galvanocautery. The wound healed slowly, but patient made a good recovery. As long as patient was heard from, which was several years, the disease did not return.

What constitutes a cure? In discussing this question, it must first be agreed what is considered a cure. A cure is a restoration to health, an elimination of disease. It is perfectly understood that the removal of a malignant tumor does not constitute a cure, but that a reasonable time must have elapsed without a recurrent growth before it can be pronounced a cure. How many years of good health is wanted, without a relapse after operation, before the profession will admit it a cure? To agree on such a time is the difficulty. Supposed a patient is well after the operation for three years, enjoyed good health, has no relapse, and then dies of pneumonia or any other disease or accident, it seems wrong to dispute a cure. It would be well, if the profession would settle this mooted question, and thus prevent disputes about statistics, so that every reporter would know how to make his tables and report cures, benefits, etc., correctly.

Aphorism about cancer theories. There can be no doubt that cancer has been cured by different methods, the knife, electricity or caustic applications, as reported by reliable practitioners. How a cure is effected appears to be simple enough, if the subject cancer could be understood (on which a diversity of opinions has been expressed). At

the present day earnest, careful students have made progress, and while there is still doubt about some points, the majority accept certain theories, and a discussion or dissertation is out of place in this paper, general theories only are given from the literature on this subject, and referred to in the Bibliography annexed under "A."

There are several theories about cancer, it may be the result of a special microbe, or an abnormal growth, the result of the action of an irritant or an injury.

There have been different opinions where cancer is a local or a constitutional disease, it may be either, or it may be local at first and later become general or constitutional; an inheritant taint may influence the organization and may develop the disease sooner. The growth of cancer is considered an epithelial growing and spreading in a wrong direction inwards. In epithelioma of the skin it is easy to find cases where the newly-formed epithelium has grown in the *cutis vera* a long distance from its starting point. That carcinoma is the local manifestation of a constitutional disease seems to be improbable. It is a neoplasm. If local in its origin, the treatment must be directed to the arrest of the new growth and the destruction of the cancer cells, at the same time preserving and protecting as much as possibly the healthy tissues. Cancer spreads by proliferation of the cells, and is carried to other parts of the body by the lymphatic vessels.

Cancer grafting and inoculation. Only recently at the meeting of the Academie de Medecine in Paris, Cornil reported successful grafting of cancer and practised by a medical man, whose name was withheld for obvious reasons. He reported two cases, of which only one has a value for observations and conclusions.

The breast was amputated with the knife, a small piece of the removed tumor was grafted under the skin of the other apparent healthy breast. Two months afterwards at the place where the grafting had taken place a nodule had developed of the size of a hazelnut. This second tumor was then also extirpated. Both specimens were carefully examined microscopically by Cornil and found malignant, identical in structure. Later the patient died of an intercurrent disease. Cornil made a post-mortem very carefully, and deliberately examined every structure in the body, as muscles, lymphatics, and bones. He did not find any traces of malignant growth or cells. The conclusion would be, that at least in this case the cancer had been exterminated, and therefore that cancer can be cured.

Von Bergman and Hahn, in Berlin, have been accused of grafting cancer in the human subject. No official report has been made about these experiments, for which the excuse has been offered, that it was done in doomed cases—cases beyond the slightest hope of recovery—and entirely for the sake of science. However, such experiments are not new, and have been made before, just as well in animals as in the human subject. References will be found in the annexed Bibliography under "B."

Is Cancer Curable? If cancer begins as a local neoplasm, the cells of which are all concentrated in one tumor, and such tumor is removed, without leaving any cancer cells behind, the cancer ought to be cured. Neither can any relapse occur, if no cancer cells are left in the body. If, later on, a new cancer develops in the same subject, because there is a new cause for such a consequence, then, such is a new case, and it cannot be said that the first case was not cured; however, it would be very difficult to prove either. The difficulty in removing all the cancer

cells in any case arises from not being able to locate such cells. If the tumor removed, contains all the malignant matter, the patient is cured ; but as such cells often are scattered in the system, distant from the seat of the tumor, which have not been found or discovered by the operator, such cells will proliferate and cause new malignant growths. No wonder, then, that so many failures occur in the treatment of cancer, and that many practitioners do not believe in cures. Nevertheless, the many reports of success by reliable men are facts, and prove practically, that cancer is curable ; but the condition of a possible success is the entire extirpation of all cancer cells from the body. If electricity can accomplish this, it is preferable to the knife, which always must remove healthy tissue, which is preserved by the use of electricity.

If the theories are true which are found in the literature consulted on this subject, some of which are fortified by practical experience and statistical reports, the following hypothesis may be made (as conclusions) :

1. Cancer is the abnormal growth of epithelium inwards (or downwards).
2. It is not proven that cancer is due to a special microbe.
3. Cancer is a neoplasm, first shown as a local manifestation.
4. It spreads by proliferation of cancer cells.
5. Cancer can be grafted.
6. Cancer can be cured by the total removal of all cancer cells.

In What Manner is Electricity Expected to Cure Cancer ? The entire removal of the cancer cells ought to cure cancer, no matter what method is used. Now the question arises, How is this effected by the use of electricity ? There are several theories and methods.

1. Strong currents of galvanism are expected to destroy the cancer cells by a mechanical action.

2. A removal of cancerous tumors by extirpation (amputation) is effected by the galvano-cautery.

3. Electrolysis by a mild current acts as an absorption by chemical decomposition.

4. Electrolysis with strong currents acts as a destruction. The strong current will destroy the malignant tumor, leaving a dead mass, which will suppurate and finally slough off, leaving a healthy surface, healing by granulations.

Whatever method is used, it must be done thoroughly and systematically, removing all cancerous cells. Success can only be expected in the earlier stages of the disease, when the malady is local and the malignant mass is concentrated in one small tumor. If the cancer cells are dispersed in different parts of the body, scattered, and the disease has advanced, success cannot be expected.

The Advantages of Electricity Against Other Methods.

1. The facility with which electricity is applied, some methods can be done without an assistant and without an anæsthetic.

2. The operations are free from danger.

3. It causes no shock after the operation.

4. It is easier to get at the whole of the disease in an early stage, than by any other means.

5. It can be used in anatomically dangerous places, beyond the reach of the knife; the horror of the knife is avoided.

6. It delays the growth, prolongs life, and benefits the patient, even if it does not always cure.

7. The patient is not necessarily confined to his bed or house:

8. The operation does not cause pyæmia or septicæmia.

9. There is no danger of hemorrhage, but it controls hemorrhage.

10. There is more chance of a cure and better healing after the operation.

11. It *always* allays pain.

In the foregoing article the details of cases have been omitted, it would have made it too long ; it has not been written for the general practitioner.

The object was to report the different electric methods which have been used in the treatment of cancer, before the meeting of experts in electricity, for discussion and improvement.

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